ANNUAL REPORT OF THE CENTRAL METEOROLOGICAL OBSERVATORY OF JAPAN

FOR

THE YEAR 1898.

PART II. 2

ON

THE BAROMETRIC DEPRESSIONS

IN

THE YEAR 1898.

PUBLISHED BY THE CENTRAL METEOROLOGICAL OBSERVATORY.

TOKIO.

1906.

The part II. of the Annual report of the Central Meteorological Observatory of Japan for the year 1898 consists of:—

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THE YEAR 1898.

INTRODUCTION.

The present report contains the result of investigations on typhoons, cyclones and secondary barometric depressions that passed over the Empire and the neighbouring seas during the year 1898.

The documents used in preparing this report are the manuscripts of tridaily weather charts of this observatory, and storm records sent from the provincial meteorological stations and naval semaphores. The meteorological logs taken on board the Imperial navies, merchant marines, and foreign vessels are also used, in so far as they are available. The Bulletines published by the Zikawei Meteorological and and Magnetic Observatory, China coast meteorological registers printed by Hongkong Observatory, and Meteorological returns sent from the Imperial Korean Customs at Chemulpo and Wonsan are consulted.

The report consists of two parts, the first part containing analysis of the barometric depressions in each month, and the second, detailed descriptions of more import storms. In the analysis of depressions, their origins, motions and lowest barometric readings are concisely stated. But in case they were attended by unusual phenomena, such as severe storms, heavy rainfalls, strong gales etc., more lengthy descriptions are given. The division of the cyclonic storms into typhoons, continental cyclones, barometric depressions etc., are, to some degrees, arbitrary, since we could not distinguish them from one another in several instances. Hence, much importance must not be assigned to the classification given in the heading of the description of each cyclones. In the description of more important storms, brief statements of their appearences, progressive motions and the state of the atmosphere during their passages are fully given. Damages in, and loss of, property by stormy winds and inundations attending the atmospheric perturbations are also stated as far as possible. Tracks of all the barometric depressions described in the text are fully exhibited on the charts in the end of the volume. Tracks of severe typhoons are given in thick lines. Each of the small circles in the track indicates the position of the centre of depression at the time specified by the figures printed near it.

1. ANALYSIS OF THE BAROMETRIC DEPRESSIONS.

January.—During this month, 14 barometric depressions passed over the Empire and neighbouring seas. Four of them were continental depressions, and came from Northern Korea and Eastern Siberia. The remaining ten depressions were the areas of low barometer. Three of these low areas developed in Southern Japan, and five of them travelled along the Pacific coast. The remaining two were first noticed in Eastern Sea, and they are probably continental storms which developed in the Yangtse valley, but we could not decide whether they were developed in the continent or in the Eastern sea, owing to the sparseness of data.

I. *Continental depression of the 1st.*—Came from Northern Korea, appeared in Northern Japan Sea on the early morning of the 1st, and entered the Pacific, traversing the strait of Tsugaru on the evening of the same day.

L. B. 752 mm.*

II. *Depression of the 3rd—the 4th.*—Developed in Southern Japan Sea on the early morning of the 3rd, moved towards the northeast and passed into the Pacific, crossing Tsugaru district about midnight of the 3rd.

L. B. Unknown.

III. *Depression of the 3rd—the 4th.*—Appeared in the Pacific on the night of the 3rd, and moved towards the northeast, passing near the island of Hachijo on the early morning of the 4th. A threatening weather was experienced on our Southeast coast during the passage of the depression.

L. B. Unknown.

IV. *Depression of the 5th—the 6th.*—Appeared near the islands of Yaeyama on the night of the 5th, moved towards the northeast, and passed into the Pacific, passing south of the island of Okinawa on the morning of the 6th. Northerly gales prevailed in the Liukius during the passage of the depression. L. B. Unknown.

V. *Continental depression of the 6th.*—Came from Northern Korea, appeared in Central Japan Sea, passed eastwards, and entered the Pacific on the 6th. This depression caused northwesterly gales on the coast of Hokkaido.

L. B. 750 mm.

VI. *Continental depression of the 9th.*—Appeared in the Gulf of Tartary on the morning of the 9th, entered the sea of Okhotsk, and finally passed into the Pacific. L. B. Unknown.

VII. *Depression of the 15th—the 16th.*—Appeared in the Formosa channel on

* L. B. stands for the lowest barometer.

the morning of the 14th, entered the Eastern sea of China, and moved towards ENE. It passed near the island of Tanegashima on the evening of the 15th. Travelling along the Pacific coast, the depression appeared off peninsula of Sagami on the morning of the 16th, and finally passed off Cape Inuboe. In consequence of the visitation of this depression, a rather severe rainstorm was felt in Southeastern Japan on the 16th. L. B. 755 mm.

VIII. *Depression of the 15th—the 18th.*—Appeared in the sea south of Formosa on the afternoon of the 15th, moved towards the northeast and passed near the island of Hachijo on the evening of the 18th. L. B. Unknown.

IX. *Depression of the 18th—the 19th.*—Developed in Southern Japan sea on the morning of the 18th, moved northeastwards and passed into the Pacific, traversing Southern Hokkaido on the 19th. A snowstorm occurred in Hokkaido during the passage of the depression. L. B. 754 mm.

X. *Continental depression of the 21st.*—Came from Eastern Siberia, appeared off Western Hokkaido on the morning of the 21st, and moved towards the east. It entered the Pacific on the evening of the same day. Northwesterly gales were felt on the coast of Hokkaido during the passage of the cyclone. L. B. 755 mm.

XI. *Depression of the 23rd—the 24th.*—Appeared near the islands of Goto on the early morning of the 23rd, moved southeastwards and entered the Pacific. It passed south of the island of Hachijo on the morning of the 24th. L. B. Unknown.

XII. *Depression of the 24th—the 25th.*—Appeared in the sea east of the islands of Liukius on the 24th, moved towards the northwest and passed off our Southeast coast on the early morning of the 25th. L. B. 740 mm.

XIII. *Depression of the 24th—the 25th.*—Appeared near the southwest coast of Kiushiu on the night of the 24th, moved towards the east and travelled along the Pacific coast. The depression coalesced with the former depression off the southeast coast of Japan proper, and formed a cyclonic area of considerable intensity. A severe snow-storm occurred in Southeastern Japan on the 25th. L. B. 740 mm.

XIV. *Depression of the 27th—the 28th.*—Developed in Southern Japan sea on the afternoon of the 27th, moved towards the northeast and entered the Pacific, traversing Southern Hokkaido on the 28th. A snow-storm occurred in Hokkaido during the passage of the depression. L. B. 745 mm.

February.—During the present month, twelve depressions passed over this country and neighbouring seas. Of these, one was a continental cyclone, one secondary

depression, and the remaining ten were areas of low barometer. Most of the barometric depressions appeared in the sea south of Liukiu or in the Pacific, and passed towards the northeast. Two of them appeared in Southern China, and moved towards this country, and other two appeared in Southern Japan sea, and passed towards the northeast.

I. *Continental cyclone of the 4th—the 6th.*—Developed in the Upper Yangtse valley and appeared southwest of Kiukiang on the 2nd. It was found lying between Kingan and Fouchow on the morning of the 3rd, and passed into the Eastern sea of China on the evening. On the afternoon of the 4th, the cyclonic centre approached to Northern Kiushu, causing threatening weather in Western Japan. It travelled along the coast of Japan sea, and was finally filled up in the Northeastern district. L. B. 750 mm.

II. *Depression of the 5th.*—Developed off our South coast on the early morning of the 5th, moved towards the east and finally passed off the peninsula of Boshu. L. B. 752 mm.

III. *Secondary depression of the 6th.*—Developed in Central Japan on the afternoon of the 6th, and passed towards the southeast. L. B. 752 mm.

IV. *Depression of the 9th—the 11th.*—Appeared off our south coast on the afternoon of the 9th, moved towards the northeast, and passed towards the southern Kuriles on the 11th. L. B. Unknown.

V. *Depression of the 9th—the 11th.*—Appeared in Southern Japan sea, moved towards the northeast, and was filled up near the strait of Tsugaru on the afternoon of the 11th. L. B. 748 mm.

VI. *Depression of the 11th—the 12th.*—Appeared in the Pacific on the 11th, and moved towards the northeast. L. B. Unknown.

VII. *Depression of the 13th—the 15th.*—Appeared in the sea south of Formosa on the night of the 13th, moved along the east coast of the island, and entered the Eastern sea of China on the morning of the 14th. Moving towards the northeast, the depression passed between the island of Amami-Oshima and Okinawa islands, and entered the Pacific on the afternoon of the 15th. L. B. 755 mm.

VIII. *Depression of the 15th—the 16th.*—Appeared in the western part of the Eastern sea of China on the night of the 15th, moved towards northeast and was filled up in Southern Kiushiu on the night of the 16th. L. B. 754 mm.

IX. *Depression of the 17th—18th.*—Appeared near the island of Ishigakijima on the night of the 17th, moved towards the northeast and entered the Eastern

sea. It passed south of the island of Amami–Oshima on the 18th, and entered the Pacific. L. B. 752 mm.

X. *Depression of the 18th—the 19th.*—Appeared off our south coast on the 18th, moved towards the east and passed near the island of Hachijo on the 19th.

L. B. Unknown.

XI. *Depression of the 20th—the 23rd.*—Appeared in the sea south of Ishigakijima on the morning of the 20th, moved towards the northeast and entered the Eastern sea of China. Passing north of the island of Amami-Oshima on the afternoon of the 21st, it entered the Pacific, and travelled along the Pacific coast of Japan. It developed into a cyclone of great intensity, as it progressed towards the east, and caused a severe storm of wind and rain on our southeast coast. We give here an extract from the meteorogical observations made at Choshi Observatory during the passage of the storm :—

Date.	Hour.	Barometer.	Wind direction	Velocity.
22	10 a	747.8	ESE	17.1 m/s
„	11	745.3	ENE	17.2
„	Noon.	42.1	ENE	14.4
„	1 p.	37.4	NNE	18.4
„	2	33.2	E	18.2
„	2.30	31.6	SSE	6.7
„	2.40	31.4	NNW	8.3
„	2.50	31.1	NW	5.2
„	3	31.0	NNW	13.4
„	3.10	30.5	NNW	16.7
„	3.20	31.3	NNW	21.4
„	3.30	32.0	NW	27.5
„	3.40	32.9	NW	30.5
„	3.50	33.0	NW	32.1
„	4	34.0	NW	34.5
„	4.20	35.4	NW	34.6
„	44.0	37.0	NW	30.2

Heavy rainfall occured at Choshi, the total amount of fall for 4 hours from 10a to 2p on the 22nd being 63 mm. The cyclonic centre then moved towards northeast, and passed east of Nemuro on the 23rd.

L. B. 730 mm.

XII. *Depression of the 24th—25th.*—Appeared in Southern Japan sea on the night of the 24th, moved towards the northeast and entered the sea of Okhotsk on the 25th. L. B. Unknown.

March.—Fifteen centres of barometric depressions passed over this country and neighbouring seas. Of these, nine were continental depressions, three of which came from the Yangtse valley, five from Northern China and Manchuria, and the remaining one from Siberia. No serious cyclone or typhoon was observed during the present month.

I. *Continental depression of February 28th—March 1st.*—Came from Southern China on the 28th of February, crossed the Eastern Sea of China, and travelled along the Pacific coast. L. B. Unknown.

II. *Continental depression of the 1st.*—Came from Eastern Siberia on the 1st, moved towards the southeast and entered the Pacific, crossing southern Okhotsk and Kuriles. L. B. 740 mm.

III. *Depression of the 3rd—the 4th.*—Appeared in Southern sea of Formosa on the 3rd, moved towards the northeast and entered the Eastern sea of China. It moved towards the island of Amami-Oshima, and finally passed into the Pacific on the evening of the 4th. L. B. Unknown.

IV. *Depression of the 7th—the 8th.*—Appeared in the Eastern sea of China on the 7th, moved towards the northeast, and entered the Pacific on the early morning of the 8th. Its track is not definitely known. L. B. Unknown.

V. *Continental depression of the 8th—the 9th.*—Came from Northern China, appeared in Western Japan sea on the early morning of the 8th, and progressed towards the east. It entered the Pacific, passing through the strait of Tsugaru on the night of the 8th. Snow-storm occurred in Northern Japan and Hokkaido during the passage of the cyclonic centre. L. B. 753 mm.

VI. *Depression of the 10th—the 11th.*—Came from Northern Korea, appeared in Western Japan sea on the night of the 10th, and progressed towards the east. It entered the Pacific, traversing Northern Japan on the 11th. L. B. 160 mm.

VII. *Secondary depression of the 11th.*—Developed in Central Japan on the afternoon of the 11th, moved towards the Southern and entered the Pacific. L. B. 160 mm.

VIII. *Depression of the 12th—the 14th.*—Appeared in Southern sea of Formosa on the afternoon of the 12th, rapidly moved over the Eastern sea of China, and travelled along the Pacific coast up to the Southern Kuriles. L. B. Unknown.

IX. *Continental cyclone of the 16th—the 17th.*—Came from Mongolia, passed over Northern China and Korea, and appeared near Wladiostok on the afternoon of the 16th. It moved towards the east, and entered the Pacific,

traversing Central Hokkaido. A severe snow-storm was experienced in Hokkaido on the 17th. L. B. 742 mm.

X. *Depression of the 19th—the 20th.*—Appeared in southern sea of Liukiu on the early morning of the 19th, moved towards the northeast and passed into the Pacific. L. B. Unknown.

XI. *Depression of the 23rd—the 25th.*—Appeared in the Eastern sea of China on the morning of the 23rd, moved towards the northeast and entered into the sea of Okhotsk on the afternoon of the 25th. The ugly weather was experienced in this country during the passage of the depressions. L. B. 755 mm.

XII. *Continental depression of the 26th—the 27th.*—Came from Southern Manchuria, appeared near Wladiostok on the afternoon of the 26th, and passed towards the Southern Kuriles, traversing Northern Hokkaido on the same day. L. B. 745 mm.

XIII *Continental depression of the 26th—the 27th*—Came from the Yangtse valley, appeared off Western Kiushiu on the morning of the 26th and crossed over Central Kiushiu towards our south coast. It was observed off the cape of Shiomisaki on the night of the 26th. L. B. 758 mm.

XIV. *Continental depression of the 28th—the 29th.*—Came from Manchuria, appeared off Western Hokkaido on the 28th and entered in the sea of Okhotsk. L. B. 748 mm.

XV. *Continental depression of March 30th—April 1st.*—Came from the Yangtse valley, appeared in the Eastern sea of China, and entered the sea of Japan. It passed towards the Southern Kuriles, traversing Hokkaido. General rainfall occured in this country, and stormy weather was experienced in cental districts. L. B. 750 mm.

April.—During this month, eleven barometric depressions passed over this country and neighbouring seas. Of these, two were continental cyclones which came from Eastern Siberia and passed towards the east, three the local secondary depressions that developed in Cental Japan, and the remaining six the areas of low-barometer. All of these barometric depressions were of no intense character, and only caused high winds or threatening weather along their ways of passage. No severe typhoons or storms were felt during the present month.

I. *Depression of the 1st—the 3rd.*—Appeared in Southern sea of Formosa on the night of the 1st, moved towards the northeast, and entered the Eastern sea of China. Traversing Central Liukius, the depression passed into the Pacific, and travelled further northeastwards. It was found lying off our

Southeast coast, causing there stormy weather on the afternoon of the 3rd. L. B. Unknown.

II. *Continental depression of the 6th—the 7th.*—Came from Siberia, appeared near the west coast of Hokkaido on the 6th, and traversed central Hokkaido. L. B. 755 mm.

III. *Depression of the 8th—the 10th.*—Appeared in southern sea of Formosa on the 8th, moved rapidly northeastwards and arrived near Northwestern Kiushiu on the afternoon of the 9th. Thence the depression made its way towards the east, and traversed Japan proper. On the early morning of the 10th, it entered the Pacific, and was lying off our east coast. After travelling along the east coast, the cyclonic centre passed towards Southern Kuriles. Stormy weather was generally experienced over the Empire during the visitation of the depression. L. B. 740 mm.

IV. *Secondary depression of the 16th.*—Developed in Central Japan on the afternoon of the 16th, and passed into the Pacific, moving towards the southwest. L. B. 758 mm.

V. *Secondary depression of the 17th.*—Developed in Central Japan on the afternoon of the 17th, moved towards the southeast, and entered the Pacific. A storm occured in Nagano district in Central Japan during the passage of this local cyclone. L. B. 755 mm.

VI. *Depression of the 20th—the 21th.*—Came from Southern China, appeared in the straits of Tsushima on the early morning of the 20th, and entered Japan sea. It travered Northeastern Japan, and passed into the Pacific on the morning of the 21th. L. B. 752 mm.

VII. *Continental depression of the 20th—the 21st.*—Came frome Eastern Siberia, anda ppeared in the southern entrance of the Gulf of Tartary on the morning of the 21st. It passed into the sea of Okhotsk on the afternoon of the same day. L. B. Unknown.

VIII. *Secondary depression of the 21st.*—Developed in Central Japan on the afternoon of the 21st, and passed into the Pacific, moving southeastwards. This secondary depression caused stormy weather in Southeastern Japan. L. B. 755 mm.

IX. *Depression of the 23rd—the 24th.*—Came from southern sea of Formosa, appeared in the Eastern sea of China on the night of the 23rd, and moved towards the northeast, gradually decreasing in depth. L. B. Unknown.

X. *Depression of the 24th—the 25th.*—Developed in Southern sea of Japan on the afternoon of the 24th, moved rapidly towards the northeast and entered

the sea of Okhotsk on the 25th. Stormy weather was generally experienced on the coasts of Japan sea. L. B. Unknown.

XI. *Depression of the 27th—the 28th.*—Appeared in the sea near Southern Liukiu on the 26th, moved towards the northeast and entered the Pacific, passing north of the Okinawa islands on the night of the 27th. The depression passed near the island of Hachijo on the 28th, causing threatening weather on the Southeast coast. L. B. Unknown.

May.—During the present month, thirteen barometric depressions passed over this country and the neighbouring seas. Of these, five were continental depressions, two secondary depressions, and the remaining six the areas of low barometer.

I. *Depression of the 1st—the 2nd.*—Came from southern sea of Formosa, appeared in the Eastern sea of China on the 1st, and passed into the Pacific gradually decreasing in depth. L. B. Unknown.

II. *Depression of the 2nd—the 3rd.*—Came from Southern China, moved towards the east, and entered the Pacific, traversing Southern Kiushiu on the 2nd. General rainfall occurred in Japan proper on the 2nd. L. B. 758 mm.

III. *Continental depression of the 7th—the 9th.*—Developed in the upper Yangtse valley and moved towards the east. It was in the northwest of Hangkow at 9 a.m. on the 7th, and passed north of Shanghai on the evening of the same day. On the morning of the 8th, the cyclonic centre was lying near Nagasaki. Traversing central Kiushiu, it entered the Pacific, and travelled along the coast of Tokaido. General rainfall was caused by the visitation of the barometric depression, and thunderstorms occurred at several localities lying near the track of the cyclonic centre. L. B. 745 mm.

IV. *Continental depression of the 9th—the 10th.*—Came from Southern Manchuria, and appeared off Western Hokkaido on the afternoon of the 9th. It traversed Northern Hokkaido, and entered the Pacific, causing a storm of wind and rain in Hokkaido on the early morning of the 10th.

L. B. 742 mm.

V. *Depression of the 11th.*—Appeared in Central Japan sea on the morning of the 11th, moved towards the east, and entered the Pacific, traversing Northeastern district on the afternoon of the same day. L. B. 751 mm.

VI. *Depression of the 11th—the 12th.*—Appeared near Southern Hokkaido, on the night of the 11th, and entered the sea of Okhotsk, traversing Northern Hokkaido. L. B. Unknown.

VII. *Secondary depression of the 11th—the 12th.*—Appeared near Nagano in Central Japan on the afternoon of the 11th, moved southeastwards and entered the Pacific on the night of the 11th. It was lying off our Southeast coast on the morning of the 12th. L. B. 750 mm.

VIII. *Depression of the 13th—the 14th.*—Appeared in Central Japan Sea on the afternoon of the 13th, moved rapidly northeastwards and entered the Pacific, traversing Northern Hokkaido on the 14th. A storm of wind and rain occurred in Hokkaido on the 13th. L. B. 745 mm.

IX. *Secondary depression of the 13th—the 14th.*—Developed in Southern Kiushiu on the afternoon of the 13th, moved along the Pacific coast and passed off the peninsula of Boshiu on the morning of the 14th. L. B. 750 mm.

X. *Continental depression of the 16th — the 18th.*— Developed in the upper Yangtse valley, moved towards the East, and entered the Eastern Sea of China on the 16th. On the morning of the 17th, it was appeared near Quelpart island, and thence it moved further eastwards. Traversing Northern Kiushiu, Western Inland Sea and Shikoku, the cyclonic centre passed into the Pacific, and travelled along the coast of Tokaido, disappearing off our South coast on the 18th. A rather severe storm of wind and rain occurred in Japan proper during the visitation of the storm. The cyclonic centre became gradually shallower as it travelled eastwards. L. B. 748 mm.

XI. *Continental depression of the 20th—the 21th.*—Came from Northern Korea, appeared in Western Japan sea on the afternoon of the 20th, and moved towards northeast. Traversing Northern Hokkaido, the depression passed into the sea of Okhotsk on the 21st. A rather severe storm occurred in Eastern and Northern Japan, and southerly gales were felt along the coasts of the Empire. L. B. 735 mm.

XII. *Depression of the 23rd—the 24th.*—Came from Southern Formosa on the 23rd, entered the Eastern sea of China and made its way towards the East. After passing off the south coast of Kiushiu, the depression moved towards the southeast. L. B. Unknown.

XIII. *Continental depression of the 29th—the 31th.*—Developed in the province between Chonking and Kiukiang in the Yangtse valley on the 28th, passed north of Shanghai, and entered the southern Yellow sea. Thence, it traversed Southern Japan sea and Northeastern Japan on the 30th, and passed into the Pacific. The centre passed off Southeastern Hokkaido on the 31th, causing stormy weather there. L. B. 745 mm.

June.—Six barometric depressions passed over this country and neighbouring seas.

Of these, three were continental depressions and the remaining four the areas of low barometer. One of the three continental cyclones came from Mongolia, and the other two from the upper valley of the Yangtsekiang

I. *Depression of the 3rd—the 6th.*—Came from southwestern sea of Formosa, moved towards the northeast and entered the Eastern sea of China on the 3rd. The depression made its way towards the east, and passed into the Pacific. On the afternoon of the 5th, the cyclonic centre appeared off the cape of Shiomisaki, and traversed southeastern Japan, causing a heavy storm of wind and rain in Japan proper. On the morning of the 6th, it appeared off Southeastern Hokkaido, L. B. 732 mm.

II. *Continental depression of the 4th — the 6th.* — Came from the Yangtse valley, appeared near the islands of Tsushima on the morning of the 4th, and entered the sea of Japan. Moving towards the northeast, the depression traversed Southeastern Hokkaido on the 6th and entered the sea of Okhotsk. L. B 747 mm.

III. *Continental depression of the 10th—the 11th.* — Developed in Mongolia, moved southeastwards, and appeared southwest of Tienting on the 8th. Crossing Northern Yellow sea, the cyclonic centre arrived Central Korea on the early morning of the 10th, and entered the sea of Japan. The depression gradually lost its energy, and finally was filled up in the north of the Peninsula of Noto on the 11th. We give below the meterological observations made at the Korean Custom house at Wonsan, and our station at Fusan during the visitation of the storm on the 10th :—

Wonsan :	9 a.m.	3 p.m.	9 p m.
Barometer.	745.8 mm.	44.8 mm.	46.7 mm.
Temperature.	18°.0	18°.0	17° 2
Wind direction.	N.E.	N.	N.
Wind force.	2	1	1

Abundant rain fell there, the total amount being 83.1 on the 10th.

Fusan :	6 a.m.	2 p.m.	10 p.m.
Barometer.	748.9 mm.	749.3 mm.	750.3 mm.
Temperature.	19°.8	20°.3	18°.2
Wind direction.	S.	S.	S.
Wind force.	4	3	3
Weather.	rain.	cloudy.	fair.

Heavy rain fell between 6 a.m. and 2 p.m., the total fall for the interval of 8 hours being 40 mm. L. B. 745 mm.

IV. *Depression of the 15th—the 18th.*—Came from southern sea of Formosa on the 15th, and entered the Eastern sea of China. The depression was at first a very shallow low area without attending noticeable atmospheric disturbances. But, as it progressed towards the east, the depression developed into a cyclonic storm of a very great energy. It passed near the island of Yakushima on the afternoon of the 17th, and entered the Pacific. The cyclonic centre travelled along the Pacific coast, and passed off the southeast coast of Japan proper on the 18th. General rainfall occurred in Japan proper, and a storm was felt at several localities during the visitation of the depression. L. B. 740 mm.

V. *Depression of the 19th—the 20th.*—Appeared in the northern sea of Formosa on the night of the 19th, moved towards the southeast and disappeared in the southern sea of Liukiu on the 20th. L. B. Unknown.

VI. *Continental depression of the 25th — the 26th.*— Developed in the upper Yangtse valley on the 23rd, moved towards the northeast and passed north of Shanghai on the evening of the 24th. Traversing the peninsula of Shangtung and Northern Korea, the depression entered the sea of Japan, and finally disappeared in the sea of Okhotsk. L. B. 750 mm.

July.—During the present month, 9 barometric depressions passed over this country and neighbouring seas. Of these nine depressions, 4 were continental depressions that came from Northern China or Manchuria, four typhoons or mere depressions, and the remaining one was a secondary depression which developed by local heating.

I. *Depression of June 29th—July 2nd.*—Appeared in Southern sea of the Liukiu on the night of the 29th, June, moved towards the north, and was lying in central part of the Eastern sea on the 30th. The cyclonic centre changed its course towards the northeast, and arrived near Moukpo in Southern Korea on July 1st. Traversing Korean peninsula, it entered the sea of Japan, and continued its northeasterly progressive motion, until it reached the sea of Okhotsk on the night of the 2nd. Southerly gales prevailed in Japan proper and Hokkaido during the passage of the storm-centre. L. B. 745 mm.

II. *Secondary depression of the 2nd.*—Developed in central Japan under the influence of the preceding cyclone on the 2nd, and moved, as a rule, towards the southeast. A cyclonic system of wind developed around the central region. L. B. 745 mm.

III. *Depression of the 3rd—the 4th.*—Came from Northern China, appeared in western Japan Sea on the 3rd, and traversed Northeastern Japan on the

4th. It entered the Pacific. A rather severe storm was experienced in several districts in Japan proper on the same day. L. B. 747 mm.

IV. *Continental depression of the 5th—the 7th.*—Developed in the lower valley of Hoang-ho, and entered the Yellow sea, passing between Shanghai and Chefoo on the evening of the 5th. Traversing Southern Korea, the cyclone entered Japan sea on the 6th, and progressed towards the northeast, gradually filling up. L. B. 745 mm.

V. *Depression of the 13th—the 14th.*—Came from east of Luzon, and approached Southeastern Formosa on the night of the 13th. Moving northwestwards the depression crossed Formosa channel and entered the continent. The cyclonic centre seems to have been filled up in Southern China.

L. B. 750 mm.

VI. *Continental depression of the 19th—the 20th.*—Appeared off the west coast of Hokkaido on the night of the 19th, traversed Northern Hokkaido, and entered the sea of Okhotsk on the 20th. A rather severe storm of wind and rain occurred in Hokkaido on the 19th. L. B. 748 mm.

VII. *Continental depression of the 21st—the 22nd.*—Appeared off the west coast of Hokkaido on the afternoon of the 21st, and entered the sea of Okhotsk, traversing Northern Hokkaido on the night. L. B. 745 mm.

VIII. *Continental depression of the 22nd—the 23rd.*—Appeared off the west coast of Hokkaido on the afternoon of the 23rd, passed towards the northeast, and entered the sea of Okhotsk. L. B. Unknown.

IX. *Typhoon of the 24th—the 27th.*—Came from the Pacific, and appeared near Southern Kiushiu on the afternoon of the 24th. Moving northeastwards, the centre passed Western Japan and entered the sea of Japan on the 25th. It appeared off Western Hokkaido on the 26th, and passed into the sea of Okhotsk on the next day. Abundant rain fell in Western Japan on the 24th and 25th. Miyazaki had 159 mm. of rain for the 8 hours from 2 p.m. to 10 p.m. on the 24th, and Kumamoto 91 mm. for the equal internal from 10 p.m. on the 24th to 6 a.m. on the 25th. L. B. 750 mm.

August.—During the present month, eight barometric depressions passed over this country and neighbouring seas. Of these, three were typhoons of more or less intense character, and the remaining five the depressions or the areas of low barometer. The typhoon of the 5th to the 12th was a noteworthy centre of the atomospheric distance, on account of its great depth and energy.

I. *Depression of the 3rd—the 4th.*—Came from Northern China, appeared near Wonsan in Korea on the morning of the 3rd, and moved towards the east.

It traversed Northeastern Japan, and entered the Pacific. The depression seems to be gradually filling up on the way towards the East.

L. B. 750 mm.

II. *Typhoon of the 5th—the 12th.*—Appeared in southern sea of the Ishigakijima on the early morning of the 5th, moved at first towards the northwest and entered the Eastern sea of China on the morning of the 6th. This typhoon was of unusual violence, and the central barometric reading was 720 mm. Traversing northern sea of Formosa, the typhoon-centre entered China near Foochow, and travelled over Eastern China. On the 8th it passed between Kiukiang and Shanghai, gradually turning its course towards the northeast. Passing over the peninsula of Shangtung, the typhoon entered Southern Manchuria, and travelled northeastwards along the east coast of Siberia, and arrived Southern Sakhalien on the 12th. The further details concerning the motion of this typhoon are given in the subsquent chapter.

L. B. 720 mm.

III. *Depression of the 13th—the 14th.*— Appeared off our South coast on the early morning of the 13th, travelled along the Pacific coast, and touched our Southeast coast on the 14th. L. B. 747 mm.

IV. *Depression of the 15th—the 16th.*—Appeared near Wladiostok on the night of the 14th, moved northeastwards, and passed to Southern Sakhalien on the 16th. L. B. 748 mm.

V. *Depression of the 17th—the 19th.*—Appeared in Formosa channel on the early morning of the 17th, moved towards the northeast and crossed over the Eastern sea of China. The depression entered the sea of Japan, and was filled up near the northwest coast of Japan. L. B. Unknown.

VI. *Typhoon of the 25th—the 26th.*— Appeared off Shiomisaki on the early morning of the 25th, moved towards the northwest, and traversed Western Inland sea district. After crossing the straits of Korea, it passed into Manchuria through Korean peninsula. This typhoon has followed an unusual course. L. B. 745 mm.

VII *Typhoon of August 26th—September 3rd.*—Appeared in Southern sea of Liukiu on the early morning of the 26th, moved towards the northwest, and entered the Eastern sea of China. After passing north of the island of Okinawajima, the typhoon moved towards the west and approached Northern Formosa on the 28th. It recurved towards the northeast near the coast of Fukien province in Southern China on the 29th. Then the centre advanced towards the northeast, gradually accelerating its speed. It traversed Southern Kiushiu on the 31th, travelled along the South coast, and

landed on the east coast of Kii peninsula. Crossing over Central Honshiu, the typhoon entered the sea of Japan on the night of September 1st, and travelled along the coast of Japan sea up to Southern Kuriles. After it recurved towards the northeast in the Eastern sea, the typhoon was gradually lossing its energy, and finally degenerated into a mere barometric depression in Japan sea. This typhoon was specially noteworthy for its unusual progressive motion. L. B. 740 mm.

VIII. *Depression of August 30th—September 4th.*—Appeared in Southern Formosan Channel on the early morning of the 30th, moved towards the northeast and entered the Eastern sea of China, traversing Central Formosa on the same day. It travelled along the chain of islands of Liukiu, crossed Southern Kiushiu and moved along our pacific coast. The centre landed near Numazu, on the 3rd of September, and traversed Eastern Japan. Again it entered the Pacific, and passed off Eastern Hokkaido on the 4th. This depression gradually developed as it travelled northeastwards until it reached Southeastern Japan. The lowest barometric reading 744.7 mm. was observed at 4 a.m. on the 3rd at Tsu Meteorological Observatory. After landing near Numazu, the depression lost its energy, and degenerated into a mere low area. L. B. 744 mm.

September.—During the present month, eight barometric depressions passed over this country and neighbouring seas. Of these, three were continental depressions, three the areas of low barometer, and the remaining two fully-developed typhoons. The first of these typhoons which visited this country on the 6th and 7th, caused a great deal of damages in plantation and property. The second one which was less severe compared with the first entered China, and could not fully traced owing to the sparseness of data.

I. *Typhoon of the 6th—the 7th.*—Came from southern Sea of Japan, and appeared off the cape of Shiomisaki on the afternoon of the 6th. It moved northeastwards, and landed near Hamamatsu at 10 p.m. of the same day. The typhoon moved straightway towards Hokkaido where it recurved towards the east, and passed into the Pacific on the evening of the 7th. This typhoon was of very intense character, and was one of the remarkable storms that visited this country in the recent times. A detailed description of it is given in the last chapter. L. B. 720 mm.

II. *Continental depression of the 9th—the 10th.*—Appeared near Wladiostok on the night of the 9th, moved towards the northeast, and entered the sea of Okhotsk on the night of the 10th. L. B. 750 mm.

III. *Depression of the 14th—the 15th.*—Appeared near the west coast of Japan

on the morning of the 14th, moved towards the northeast, and traversed Northeastern Japan on the 15th. It entered the Pacific, and passed off Southern Hokkaido. L. B. 751 mm.

IV. *Depression of the 16th—the 17th.*—Developed off the peninsula of Noto on the night of the 16th, moved towards the northeast, and traversed Northeastern Japan. L. B. 754 mm.

V. *Depression of the 20th—the 21th.*—Appeared off our south coast on the afternoon of the 20th, and passed northeastwards. L. B. Unknown.

IV. *Continental depression of the 23rd.*—Appeared near Wladiostok on the morning of the 23rd, moved towards the northeast and entered the sea of Okhotsk on the night of the same day. L. B. Unknown.

VII. *Continental depression of the 28th—the 30th.*—Developed in the upper Yangtsekiang valley, and was lying near Chonking on the 27th. Moving northeastwards, the cyclonic centre entered the Yellow sea, and traversed Southern Korea and Japan sea from the 28th to the 30th. It travelled along the west coast of Hokkaido, and passed towards Southern Saghalien. L. B. 755 mm.

VIII. *Typhoon of sept. 29th to October 1st.*—Appeared in eastern sea of Luzon on September 27th, marched towards the northwest, and traversed Southern Formosa on the 30th. After crossing Formosan channel, the typhoon-centre entered into the continent, and travelled up to the Yangtse valley. A storm of wind and rain was felt at Hangkow and Kiukiang. A detailed description is given in the next chapter. L. B. 731 mm.

October.—During the present month, six barometric depressions passed over this country and neighbouring seas. None of these depressions did not cause serious storms.

I. *Typhoon of the 16th—the 18th.*—Came from eastern sea of Luzon, appeared near Southwestern Formosa, and recurved its course towards the northeast near Anpin. The centre crossed Cental Formosa, and entered the Eastern Sea of China, gradually filling up. L. B. 752 mm.

II. *Continental depression of the 15th—the 16th*—Appeared near Wladiostok on the 15th, marched towards the northeast, and entered the sea of Okhotsk, traversing Northern Hokkaido on the 16th. L. B. 750 mm.

III. *Depression of the 19th—the 20th.*—Appeared in the Eastern sea of China, moved towards the northeast, and travelled along the Pacific coast of Japan. It passed near the island of Hachijo on the night of the 20th. L. B. Unknown.

IV. *Continental cyclone of the 21st.*—Appeared near Southern Saghalien on the early morning of the 21st, and passed into the Pacific, traversing Southern Kuriles. L. B. 748 mm.

V. *Depression of the 23th—the 25th.*—Appeared in southern sea of Formosa on the night of 23th, marched towards the northeast and entered the Eastern sea of China. Passing between the islands of Amami-Oshima and Okinwa the cyclonic centre passed into the Pacific, and travelled along the coast of Japan proper. It was found lying near the island of Hachijo on the 25th. A rather severe storm of wind and rain occurred on the southeast coast of this country. L. B. Unknown.

VI. *Depression of the 26th—the 27th.*—Appeared near Wladiostok on the early morning of the 26th, moved towards the northeast, and entered the sea of Okhotsk, traversing the strait of Soya. L. B. 745 mm.

November.—During the present month, seven barometric depressions passed over or near this country. Of these, two were continental depressions; two typhoons; and the remaining three the areas of low barometer. The both typhoons were of moderate intensity, and caused no serious damages to life and property.

I. *Depression of the 2nd—the 3rd.*—Appeared near South cape of Formosa on the early morning of the 2nd, moved northeastwards, and traversed the southern part of the Eastern sea of China. After passing off Southern Kiushiu, the cyclonic centre entered the Pacific, and travelled along the coast of Japanese Empire on the 3rd. A heavy rain fell on the Pacific coast during the passage of the storm. L. B. 750 mm.

II *Depression of the 7th—the 9th.*—Appeared in southern Japan sea on the 7th, moved towards the northeast, and entered the Pacific, crossing Northeastern Japan on the 9th. L. B. 755 mmi

III. *Continental depression of the 10th—the 11th.*—Appeared in the gulf of Tartary on the night of the 10th, moved southeastwards and entered the Pacific on the 11th. A severe snowstorm occurred in Hokkaido on the 11th. L. B. 746 mm.

IV. *Typhoon of the 16th—the 18th.*—This typhoon which was first announced by the Central Observatory at Manila existed in eastern sea of the Philippines on the 10th. At first, it moved, as a rule, towards the northwest, and arrived in the sea which separates Formosa and Luzon. After recurving towards the northeast, thet yphoon appeared off Southwestern Formosa on the 16th. Traversing the island of Formosa, it entered the Eastern sea of

China, and progressed further eastwards. It crossed over Southern Kiushiu on the 18th, and thence, travelled along our Pacific coast, causing stormy weather in Japan proper. L. B. 750 mm.

V. *Typhoon of the 20th—the 23rd.*—Appeared in the sea south of Formosa on the 20th, moved toward the northeast and passed near the island of Hachijo on the 23rd. Since this depression passed over the Pacific, none of the meteorological logs taken on board the vessels which were then navigating there were not available, so that its track and state of its motion were not definitely known. L. B. Unknown.

VI. *Depression of the 25th—the 27th.*—Appeared in the sea south of the Liukius on the 25th, travelled along the islands and arrived off southeastern Kiushiu on the 26th. The cyclonic centre landed on the Southwest coast of Kii on the 26th, and traversed over Southeastern Japan on the 27th. A rather severe storm of wind and rain was felt in Eastern Japan generally. The centre entered the Pacific on the evening of the 27th. L. B. 755 mm.

VII. *Continental depression of the 25th—the 27th.*—Appeared near Wladiostok on the night of the 25th, moved towards the northeast and passed into the Pacific, crossing over Northern Hokkaido and the Southern Kuriles on the 26th. L. B. 750 mm.

December.—During the present month, 17 barometric depressions passed over this country and neighbouring seas. Of these, five were secondary depressions which developed in Central Japan ; four, continental depressions ; seven ordinary depressions, and the remaining one was a typhoon.

I. *Depression of the 1st—the 2nd.*—Appeared off Southern Formosa on the 1st, travelled along the chain of islands of Liukius and arrived south of Cape Shiomisaki on the 2nd. General rainfall set in over Japan proper. A heavy rain fell on the Southeast coast. The depression moved off the last coast, and passed into the Pacific. L. B. 750 mm.

II. *Depression of the 5th—the 6th.*—Appeared off the cape of Shiomisaki on the 5th, and travelled off our south coast. L. B. Unknown.

III. *Depression of the 5th—the 6th.*—Developed near the peninsula of Noto on the night of the 5th, moved northeastwards, and passed into the sea of Okhotsk, traversing the strait of Soya. L. B. 750 mm.

IV. *Typhoon of the 12th—the 14th.*—Appeared in the southern sea of the Liukius on the 12th, moved along the islands, and passed off south coast of Japan on the night of the same day. The barometer fell decidedly, and general rainfall set in all over the Empire. The typhoon-centre travelled over

Southeastern Japan, and passed into the Pacific on the afternoon of the 13th. It passed along the south coast of Hokkaido, causing a heavy snowstorm on the 13th. L. B. 734 mm.

V, *Depression of the 13th—the 14th.*—Appeared in Southern Japan sea on the morning of the 13th, moved northeastwards, and entered the Pacific, passing through the strait of Tsugaru on the morning of the 14th. A heavy snow-storm occurred in Hokkaido on the 14th. L. B. 738 mm.

VI. *Depression of the 14th—the 15th.*—Came from Northern Korea, appeared near the northwest coast of Japan proper on the afternoon of the 14th, and moved northeastwards, passing off the south coast of Hokkaido.

L. B. 750 mm.

VII. *Continental depression of the 17th.*—Came from Amur province on the morning of the 17th, moved southeastwards and entered the Pacific, traversing the southern Kuriles on the evening of the same day. L. B. Unknown.

VIII. *Secondary depression of the 18th.*—Developed in Central Japan on the afternoon of the 18th, and entered the Pacific, moving southeastwards.

L. B. 758 mm.

IX. *Secondary depression of the 19th.*—Developed in central Japan on the afternoon of the 19th, moved towards ESE, and entered the Pacific.

L. B. 758 mm.

X. *Continental depression of the 19th—the 20th.*—Came from Northern Korea, appeared in Central Japan sea on the 19th, and moved northeastwards, passing the strait of Tsugaru on the night of the 19th. The centre of depression travelled along the South coast of Hokkaido, and passed south of Nemuro on the evening of the 20th. L. B. 740 mm.

XI. *Secondary depression of the 21st.*—Developed near Mount Fujisan on the afternoon of the 21th, and entered the Pacific, moving southeastwards.

L. B. 758 mm.

XII. *Secondary depression of the 22nd.*—Developed near Mount Fujisan on the afternoon of the 22nd, and entered the Pacific, moving towards the southeast. Northwesterly gale set in over Japan proper on the 22nd.

L. B. 758 mm.

XIII. *Continental depression of the 24th.*—Appeared on the east coast of Amur province on the morning of the 24th, and entered the sea of Okhotsk, traversing Southern Saghalien. L. B. Unknown.

XIV. *Secondary depression of the 24th—the 25th.*—Developed near the island of

Sado on the afternoon of the 24th. and entered the Pacific, traversing Northeastern Japan on the evening of the same day. L. B. 753 mm.

XV. *Continental depression of the 26th.*—Came from Eastern Siberia, moved towards the northeast and entered the sea of Okhotsk on the 26th. L. B. Unknown.

XVI. *Depression of the 24th—27th.*—Appeared in the southern sea of Formosa on the night of the 25th, moved northeastwards and travelled along the chain of islands of Liukiu. The depression entered the Pacific, passing north of of Amami-Oshima on the night of the 26th, and progressed along our Pacific coast. It passed near the island of Hachijo on the evening of the 27th. A general rainfall occurred in Japan proper, and a storm of wind and rain was was felt on the Southeast coast. L. B. 755 mm.

XVII. *Depression of the 28th and the 29th.*—Appeared in Central Japan sea on the night of the 28th. and passed away into the Pacific, traversing Northern Japan on the 29th. L. B. Unknown.

II. REMARKABLE TYPHOONS.

1. Typhoon of August 5 to 12.

The approach of this typhoon was first noticeable on our morning chart of the 4th. The 10 p.m. observations of the same day at stations in the Liukiu islands clearly shewed that the typhoon was steadily approaching to Southern Liukiu. Our observer at the Ishigakijima meteorological observatory in Southern Liukiu described first indications of the commencement of bad weather there in the following words :—" On the 2nd, the barometer indicated 753.0 mm. at 6 a.m. Wind was easterly, and strong in force. The weather was mostly fair during the day. We had a light shower about at 8 a.m. On the next day, the barometer fell to 750.6 mm. at 10 p.m. Wind was variable, and the weather mostly cloudy. Showers were experienced. At 10 p.m., the sky was almost cleared up. On the 4th, the rapid fall of barometer was continuing, and 747.6 mm. was observed at 10 p.m. The weather was cloudy, and force of wind increasing. Showers occurred frequently. Lightnings were seen in the southwest. About at 7 p.m. of the same day, deep yellow-reddish clouds, apparently of the form of cirrostratus covered the whole sky, and observed to move from east to west with a moderate speed."

On the early morning of the 5th, the typhoon was lying in the sea south of Ishigakijima, making its way towards the northwest. The barometer fell with great rapidity and the force of wind steadily increased in the Liukius. We give

below an extract from the meteorological register of the Ishigakijima observatory taken during the passage of the typhoon :—

Ishigakijima.

24°20′ N.L. 124°7′ E.G. 7 m. above see level.

Date	Hour	Barometer	Direct. of wind	Velo. of wind	Weather.
5	2p	738.5 mm.	NE	26.2 m.p.s.	Gale, slight rain.
,,	5p	35.8	NE	25 5	,,
,,	7p	31.8	NE	30.4	,,
,,	7,30p	29.3	NE	30.9	,,
,,	8p	28.7	NE	30.8	,,
,,	8,30p	26.4	NE	26.1	,,
,,	9p	24.9	NE	29.7	,,
,,	9,30p	23.5	NE	26 6	,,
,,	10p	23.2	NE	30.0	,,
,,	10,30p	22.1	NE	28.3	,,
,,	11p	22.5	E	28.4	,,
,,	11,30p	21.1	E	28.4	,,
,,	Midnight	21.0	SE	25.7	,,
6	0,30a	21.4	E	27.4	,,
,,	1a	22.0	SE	(6)	,,
,,	1,30a	23 1	S	(6)	,,
,,	2a	23.2	S	(6)	Gale, rain
,,	2,30a	24.2	S	(6)	,,
,,	3a	26 0	S	(6)	,,
,,	3,30a	27.2	S	(6)	,,
,,	4a	28.3	S	(6)	,,
,,	4,30a	31.0	S	(6)	Gale, heavy rain.
,,	5a	32.5	S	(6)	,,
,,	5,30a	34.7	S	(6)	,,
,,	6a	34.7	S	(6)	,,
,,	6,30a	36.3	SSW	(6)	,,
,,	7a	36.7	S	(6)	,,

At the station, the lowest barometer was observed at the midnight of the 5th, the reading being 721 mm. Wind veered from northeast to south, showing the centre of typhoon passed west of the station. Wind became furious, and heavy rain set in about at 4 a.m. of the 6th. One of the two cup-anemometers which were then in a good acting condition at the station was blown away, while the other was greatly damaged about at 4 a.m. of the same day. Telegraphic communications in the islands were suspended. Several houses and buildings were also damaged.

On the morning of the 6th, the typhoon entered the Eastern sea of China, and travelled over the sea north of Formosa. It landed on the continent, and passed between Kiukiang and Shanghai on the 8th. The followings are the meteorological observations taken at the Zikawei Observatory near Shanghai :—

Date	Hour	Barometer	Direct. of wind	Vel. of wind.
9	1a	750.39 m.	E	22 km.p.h.
,,	5a	48.66	SE	36
,,	10a	48.37	ESE	39
,,	noon	47.85	SE	49
,,	1p	47.31	SE	48
,,	2p	46.76	SE	45
,,	3p	46.52	SE	55
,,	4p	46.57	SE	51
,,	5p	46.78	SSE	47
,,	6p	47.09	SSE	38
,,	7p	47.52	SSE	36
,,	8p	47.73	SSE	33
,,	9p	48.29	SSE	32
,,	10p	48.35	SSE	27

The duration of lowest barometer at the Observatory was abnormally long, showing the typhoon-centre passed almost round Shanghai. A rainstorm occurred in the lower Yangtse valley during the passage of the typhoon. Passing over the peninsula of Shangtung, the typhoon entered Southern Manchuria, and travelled northeastwards. It arrived in Southern Saghalien on the 12th. Owing to the sparseness of date, the track of typhoon lying over the continent as shown in Pl. VIII. is more or less imperfect.

2. *The Typhoon of September 6 to 7.*

The typhoon which we intend to describe in the following lines is one of the severest cyclonic storms that visited this country in the recent times, and belongs to the category of terrific typhoons which come from the Marshal islands, and visit our South or Southeast coast in late summer or in early fall. On the night of the 4th, a general fall of barometer took place in the Southwestern islands and on the south coast of Japan proper, showing a remarked evidence of the existence of a depression off our South coast. The barometer continued falling during the 5th, and northeasterly wind set in over Southwestern Japan.

On the morning of the 6th, a typhoon of unusual violence appeared south of Cape Shiomisaki, causing a decided fall of barometer on the south coast of Japan.

Rain set in over Southern and Central Japan, and northeasterly winds were increasing in force.

At 2 p.m. on the same day, the typhoon was lying off the cape, apparently making its way towards the northeast. A heavy storm of wind and rain occurred generally.

The centre of typhoon landed near Hamamatsu, a town in Tokaido, about at 10 p.m. of the 6th, marched northeastwards over Northeastern Japan, and arrived in Central Hokkaido where it recurved towards the east, and passed away into the Pacific. We give below the meteorological observations taken at the Hamamatsu meteorological station during the passage of typhoon :—

Hamamatsu.

Date	Hour	Barometer	Direct. of wind	Vel. of wind	Weather.
6	1p	751.0 mm.	ENE	12.4	Rain, gale.
,,	3p	48.3	ENE	17.8	Heavy rain, gale.
,,	5p	44.6	E	23.4	,,
,,	6p	42.0	E	24.5	,,
,,	7P	39.2	E	29.5	,,
,,	7,30p	36.1	E	33.1	,,
,,	8p	34.4	E	33.9	Rain, gale.
,,	8,30p	31.7	E	—	,,
,,	9p	28.0	E	—	,,
,,	9,15p	24.8	E	—	,,
,,	9,30p	22.3	E	—	,,
,,	10p	18.9	E	—	,,
,,	10,30p	18.9	SW	5.1	Slight rain.
,,	11p	21.4	WSW	11.9	Rain, gale.
,,	11,30p	29.5	W	—	,,
,,	Midnight	37.3	W	—	,,
7	1a	45.5	WSW	3.5	Rain.
,,	2a	46.8	WSW	8.4	Slight rain.
,,	3a	48.3	W	10.1	Cloudy, gale.

From the above table it will be seen that the centre of typhoon passed very near the town about at 10 p.m. on the 6th. A sudden fall of wind force was experienced there, showing that the town was then within the central calm of the typhoon.

Now, we shall give the lowest barometers observed at the meteorological stations

lying near the track of the cyclonic centre, together with the greatest wind velocities observed :—

Stations	Lowest barometer	Time	Max-vel. of wind	Direct.	Time.
Hamamatsu	718.9 mm.	6th, 10 p.m.	33.9 m.p.s.	E	6th, 8 p.m.
Iida	729.9	6th, midnight.	14.7 ,,	W	7th, 2 a.m.
Kofu	735.0	7th, 1,30 a.m.	28.9 ,,	SE	7th, 1 a.m.
Mayebashi	738.1	7th, 3,30 a.m.	31.3 ,,	E	7th, 1 a.m.
Utsunomiya	739.9	7th, 5 a.m.	18.4 ,,	S	7th, 5 a.m.
Fukushima	740.9	7th, 6 a.m.	28.2 ,,	NW	7th, 10 a.m.
Yamagata	739.7	7th, 7 a.m.	8.5 ,,	NW	7th, 10 a.m.
Ishinomaki	739.6	7th, 8 a.m.	34.0 ,,	S	7th, 8 a.m.
Miyako	738.8	7th, 11 a.m.	11.0 ,,	S	7th, 2 a.m.
Tokachi	740.0	7th, 2,30 p.m.	10.8 ,,	WNW	8th, 8 a.m.
Nemuro	735.5	7th, 6 p.m.	29.5 ,,	NW	8th, 4 p.m.

This table shows that the typhoon progressed over Japan proper with decreasing depth, owing probably to the resisting friction of the land surface over which the aerial vortex moved.

The state of the upper stratum of the atmosphere during the passage of the typhoon was accurately known from series of observations made by our observers who were then sent on the summit of Mount Fujiyama for the purpose of keeping a temporary meteorological station during the Summer

Mount Fujiyama is an extinct valcano of a conical shape of a remarkable symmetry, which stands isolated on our Pacific coast, and is within a day's journey by train and car from Tokio. Every year, the director of the Central Meteorological Observatory sends a party of observers to keep a temporary station on the summit, and to make observations of various elements. The height of the temporary station is 3720 metres above sea level.

On Mount Fujiyama, strong winds set in on the early morning of the 5th. Dense fog occurred, and the temperature fell in rapidity. The mercury stood about 6 to 8 degrees below the ordinary temperature prevailing on the summit during the period, and chilly coldness was felt.

The barometer began to fall slightly at 10 p.m. on the same day, southeasterly winds prevailed, and rain fell abundantly. Velocity of wind reached 29.2 m. per second at the midnight of the 5th. Between 2 a.m. and 10 a.m. on the 6th, the barometer changed very little, and wind fell in intensity. But the barometer began to fall rapidly, and wind backed towards the east at 2 p.m. The rain fell in torrents, and 51 mm. for the one hour previous to the above hour was observed. Wind

became furious, dashing against all the buildings on the summit. The barometer made violent pumpings, the range being about 5 to 7 mm. The anemometer was blown off at 9 30 p.m. so that the velocity of wind was to be estimated. At 11,40 p.m., the barometer suddenly fell to 470 m., and wind force decreased. After a short time, the pressure increased about 3 mm., and wind turned towards the southwest. A severe rain storm occurred again. The barometer began to fall, and the minimum 463.4 mm. was observed at 1,35 a.m. on the 7th. The storm ceased on the morning of the day.

We give below an extract of meteorological observations made at Mount Fujiyama during the passage of the typhoon. The barometric pressures given in the table are the readings of mercurial barometer reduced to O°C., and not reduced to standard gravity and to sea level.

Mt. Fujinoyama.

Date	Hour	Barometer	Temperature	Direct. of wind	Vel. of wind	rainfall
5	6 p.m.	491.4	4.4°	SE	13.3	0.5
,,	8 ,,	491.4	4.4	SE	11.2	2.1
,,	10 ,,	490.4	4.2	SE	18.0	5.2
,,	Midnight	490.2	4.0	ESE	29.2	9.3
6	2 a.m.	489.3	4.7	SE	18.8	34.8
,,	4 ,,	488.5	4.0	SE	21.9	19.6
,,	6 ,,	488.6	5.1	SSE	16.8	39.8
,,	8 ,,	488.9	6.7	S	16.8	13.2
,,	10 ,,	488.4	6.2	SSE	11.1	23.0
,,	Noon	487.2	6.5	SSE	8.7	25.0
,,	2 p.m.	485.5	7.7	SE	14.5	14.7
,,	4 ,,	484.9	7.2	SE	26.6	29.6
,,	5 ,,	483.8	7.1	SE	33.1	28.0
,,	6 ,,	484.2	7.5	SE	29.7	26.2
,,	7 ,,	483.4	8.0	E	34.2	39.0
,,	8 ,,	480.8	8.2	E	36.9	51.0
,,	9 ,,	478.4	8.1	E	35.1	34.4
,,	10 ,,	478.8	8.5	SE	(6)	35.0
,,	11 ,,	477.0	7.8	SSW	(6)	42.6
,,	11,40 p.m.	470.0	7.0	SSW	(6)	—
,,	Midnight	474.6	6.5	SW	(6)	54.4
7	1 a.m.	471.9	6.5	SW	(6)	50.6
,,	1,35 a.m.	465.8	6.6	SW	(6)	—
,,	2 a.m.	473.4	7.0	W	(9)	36.0

Date	Hour	Barometer	Temperature	Direct, of wind	Vel. of wind	Rainfall
7	3 a.m.	475.9	6.1	W	(6)	24.7
,,	4 ,,	478.4	5.5	W	(5)	4.0
,,	5 ,,	482.7	6.3	W	(6)	0.6
,,	6 ,,	483.6	6.9	W	(5)	0.0
,,	7 ,,	484.6	5.7	W	(4)	—
,,	8 ,,	486.5	6.5	W	(4)	—

3. *The Typhoon of September 29 to October 1.*

On the early morning of the 29th, September, the barometer began to fall quickly in Southern Riukiu and Formosa, showing the approach of a typhoon to the islands. At 2 p.m. of the same day, the typhoon was lying south of Ishigakijima, apparently making its way toward the northwest. Northeasterly wind increased in force over the Liukiu, and northerly gale or strong wind was prevailing in Formosa. A thunder storm was felt in the Pescadores.

The typhoon travelled northwestwards, and traversed Central Formosa on the 30th. In Formosa and the neighbouring islands, a severe storm of wind and rain occurred on the 29th and 30th, and a great deal of damages in property was done. The following is an extract of meteorological observations taken at Taichu in Formosa during the storm :—

Taichu meteorological Observatory.

Date	Hour	Barometer	Direct. of wind	vel. Wind
30	2 a.m.	742.9	N	6.8 m.p.s.
,,	5 a.m.	41.2	N	4.2 ,,
,,	6 a.m.	40.9	NE	5.0 ,,
,,	7 a.m.	39.9	N	6.0 ,,
,,	8 a.m.	39.6	N	5.9 ,,
,,	9 a.m.	38.5	NNE	7.6 ,,
,,	10 a.m.	36.0	NNE	13.3 ,,
,,	11 a.m.	32.5	N	19.6 ,,
,,	Noon	30.5	N	22.6 ,,
,,	1 p.m.	27.9	N	15.9 ,,
,,	2 p.m.	29.0	NE	8.5 ,,
,,	3 p.m.	31.1	SW	3.1 ,,
,,	4 p.m.	32.4	SSE	2.5 ,,
,,	5 p.m.	33 0	E	1.6 ,,
,,	6 p.m.	33.1	SE	1 7 ,,
,,	7 p.m.	34.3	S	2.6 ,,

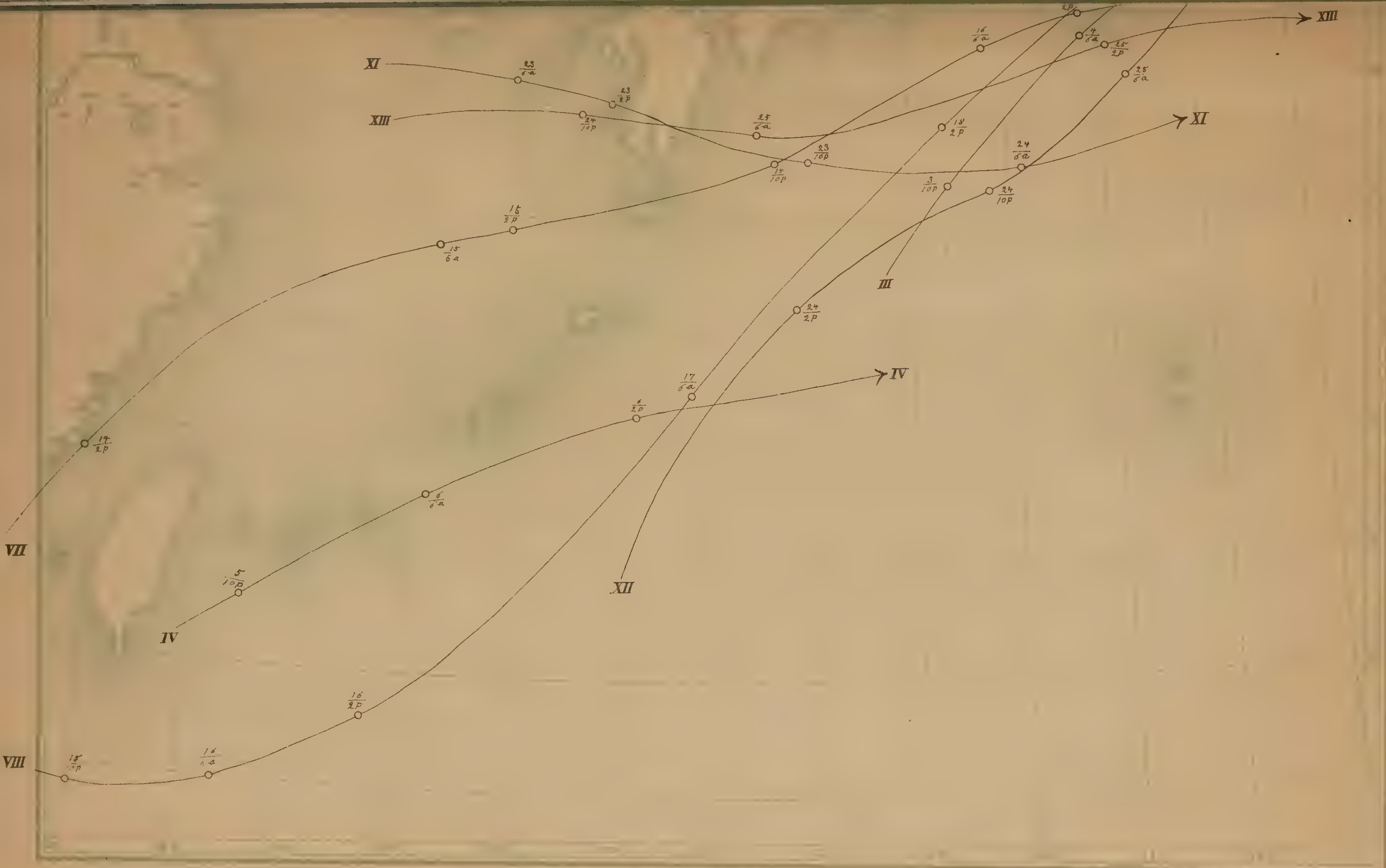
A thunderstorm was observed about at 2 p.m., when the typhoon-centre was very near the Observatory.

Crossing Formosan channel, the typhoon entered the continent and travelled towards the upper Yangtse. A heavy storm occurred at Kiukiang and Hangkow, river ports in the valley of Yangtse.

PL. I.



TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
January, 1898.
VI
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TRACKS
OF THE
BAROMETRIC DEPRESSIONS.

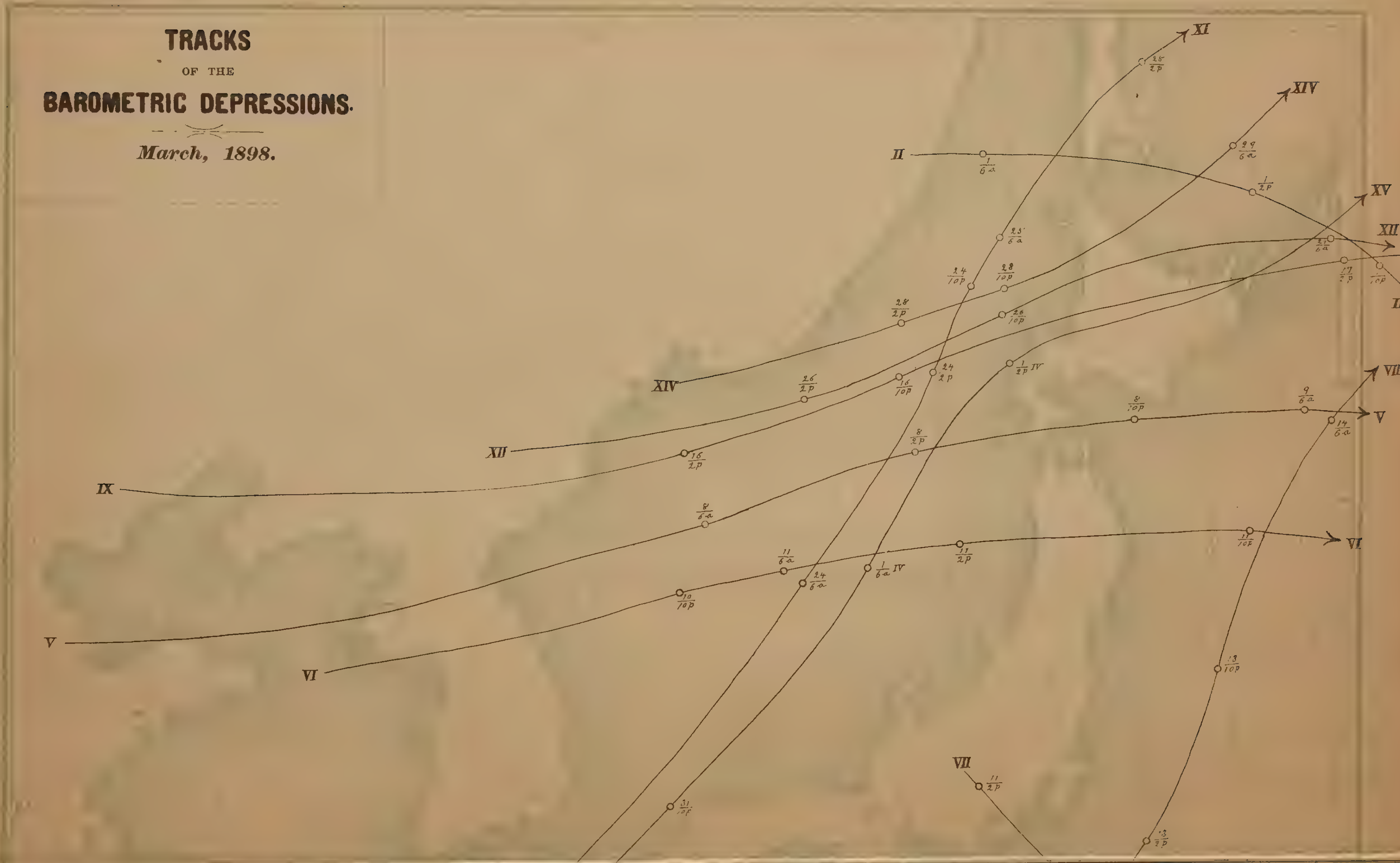
February, 1898.

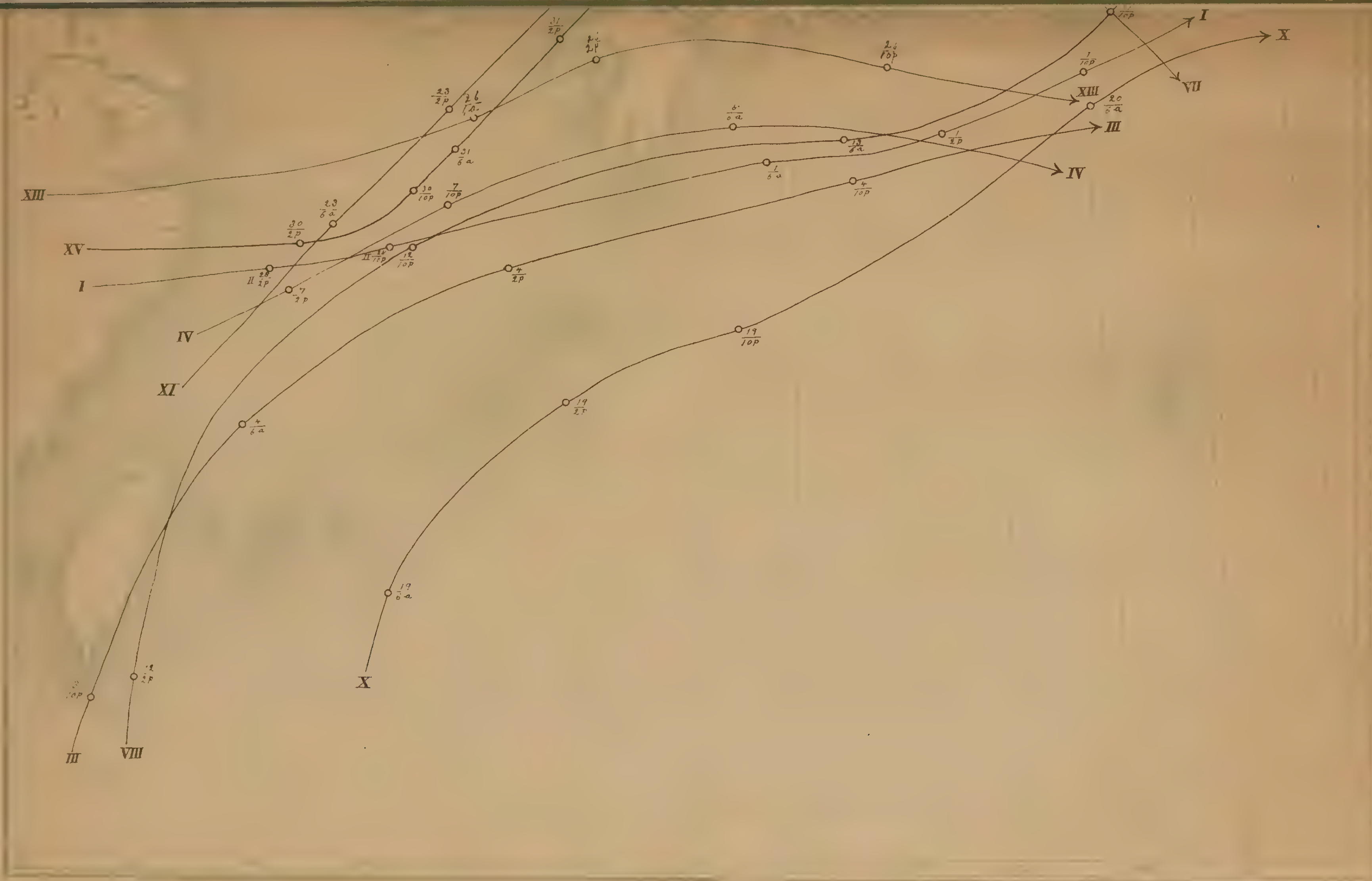



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TRACKS
OF THE
BARGMETRIC DEPRESSIONS.

March, 1898.

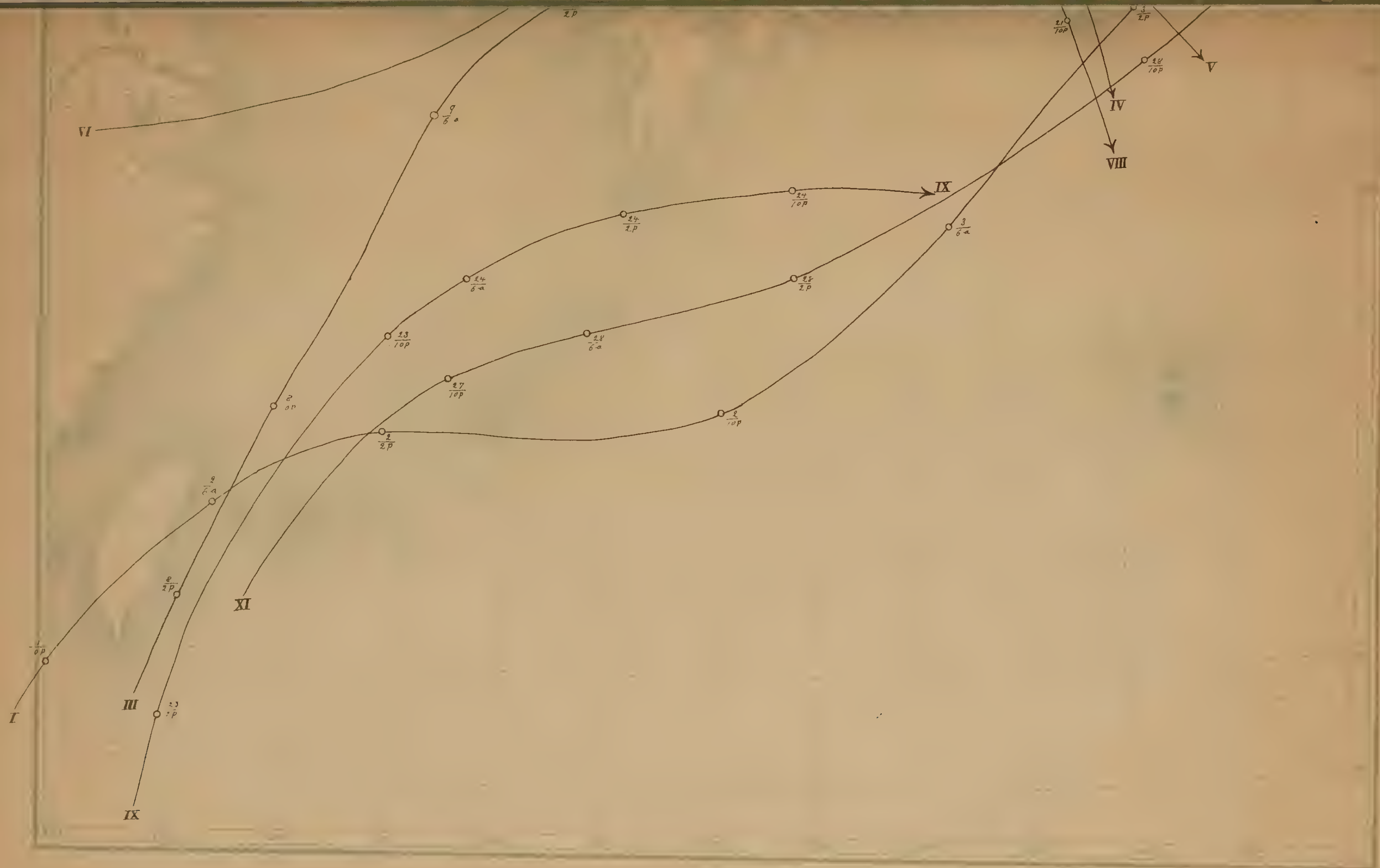




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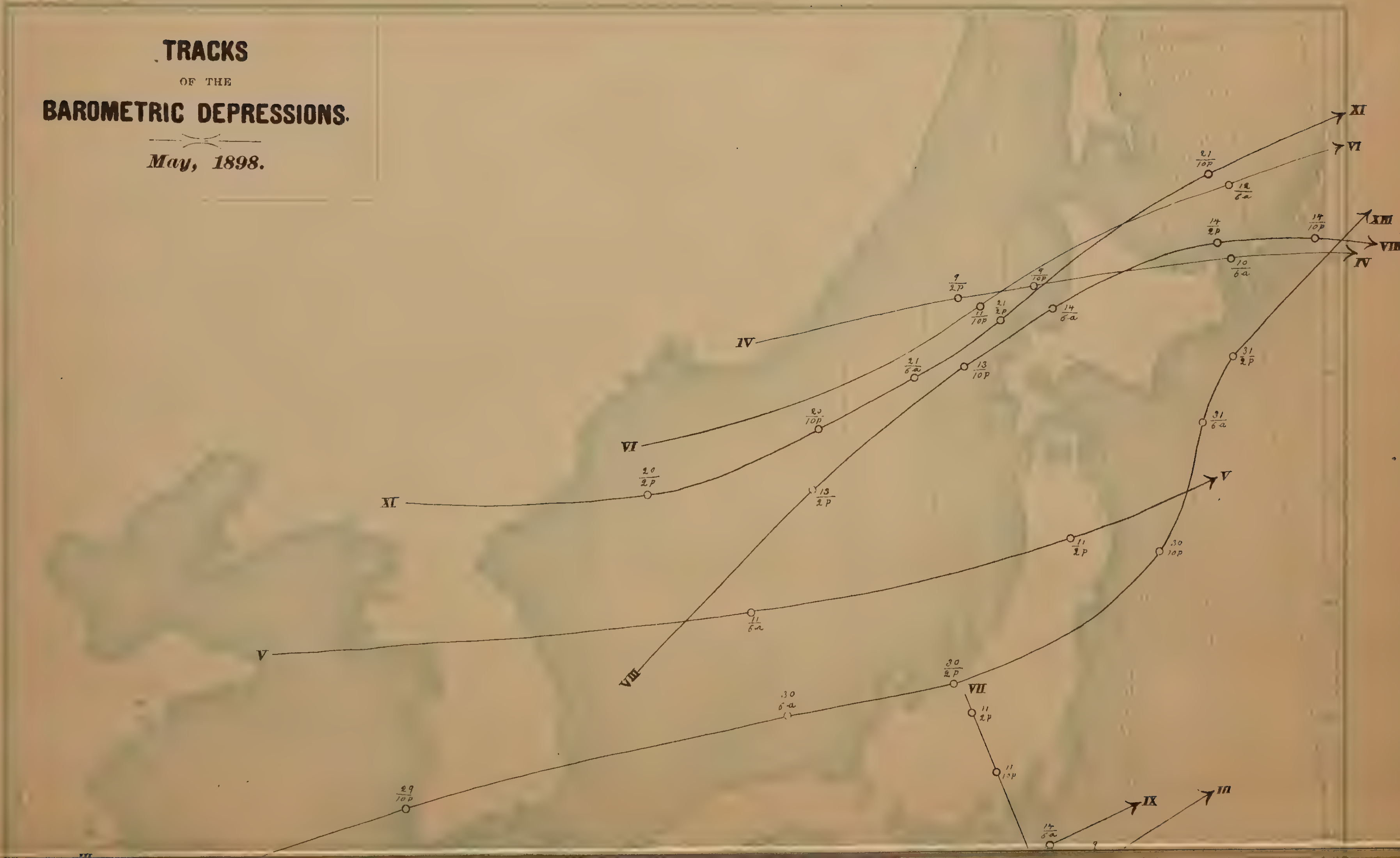
PL. IV.

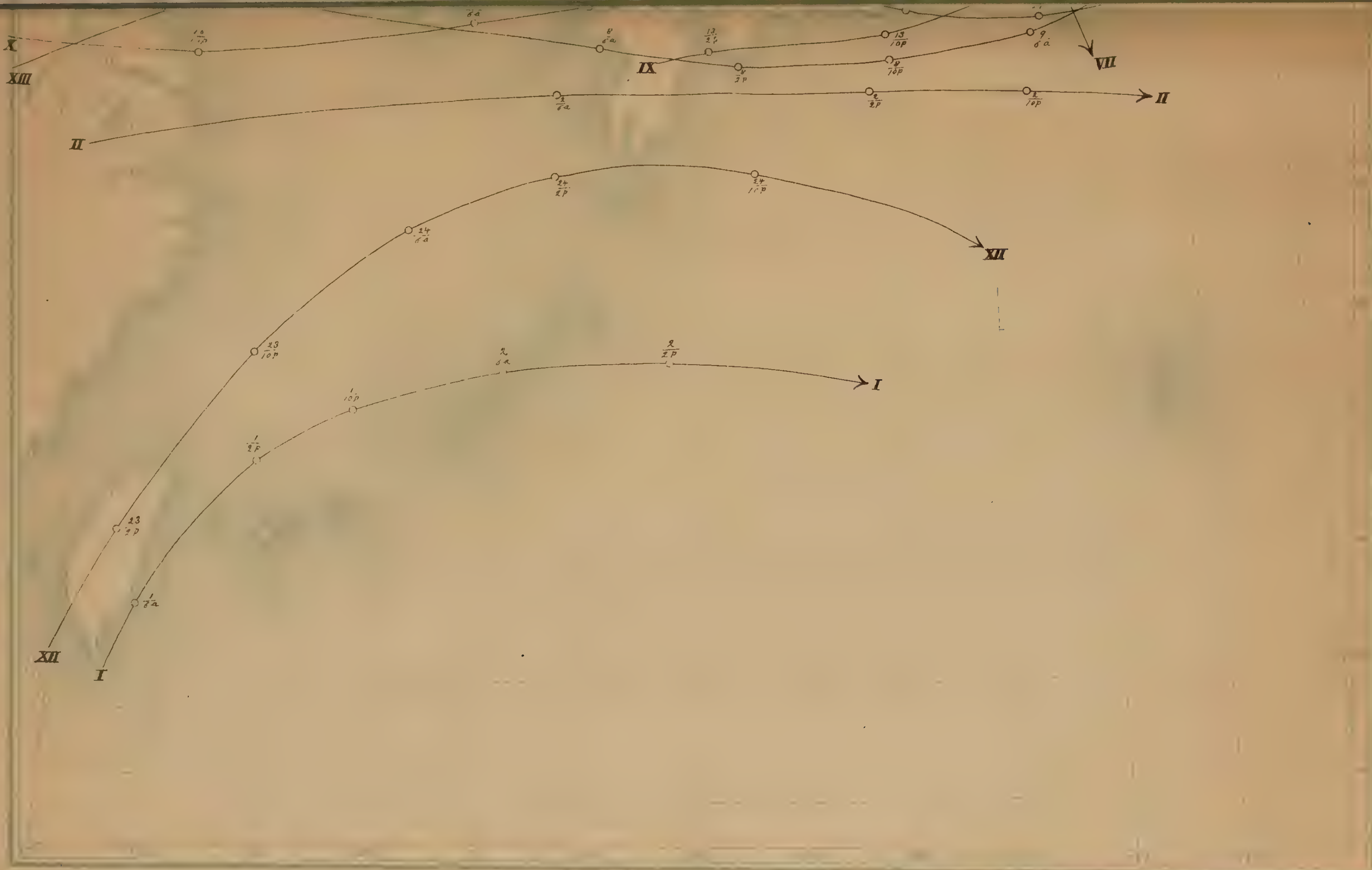

TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
April, 1898.
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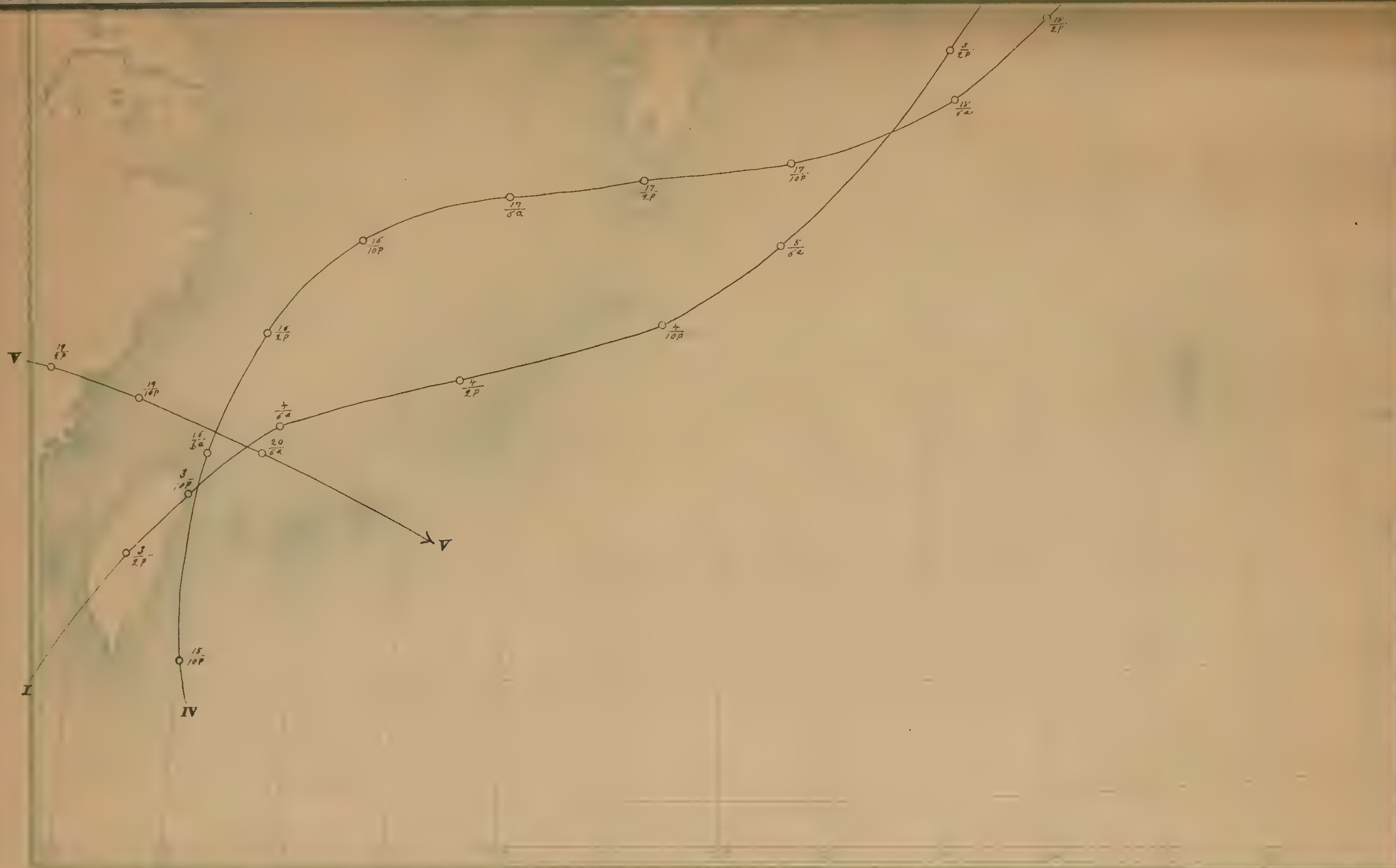
VI
9/6a
IV
VIII
V
IX
24/10p
24/2p
3/6a
24/6a
28/2p
23/10p
28/6a
27/10p
2/10p
2/2p
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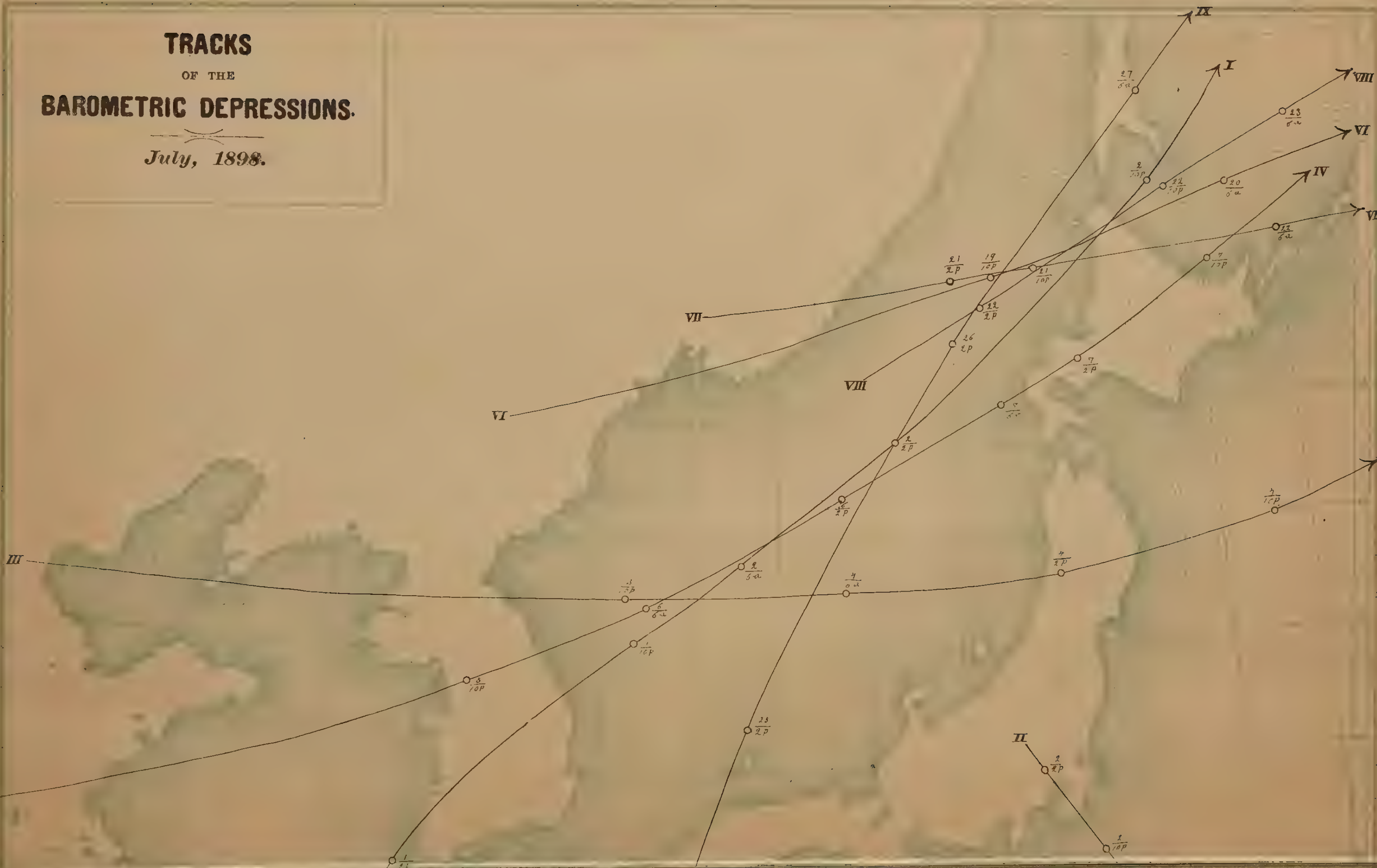
PL. V.

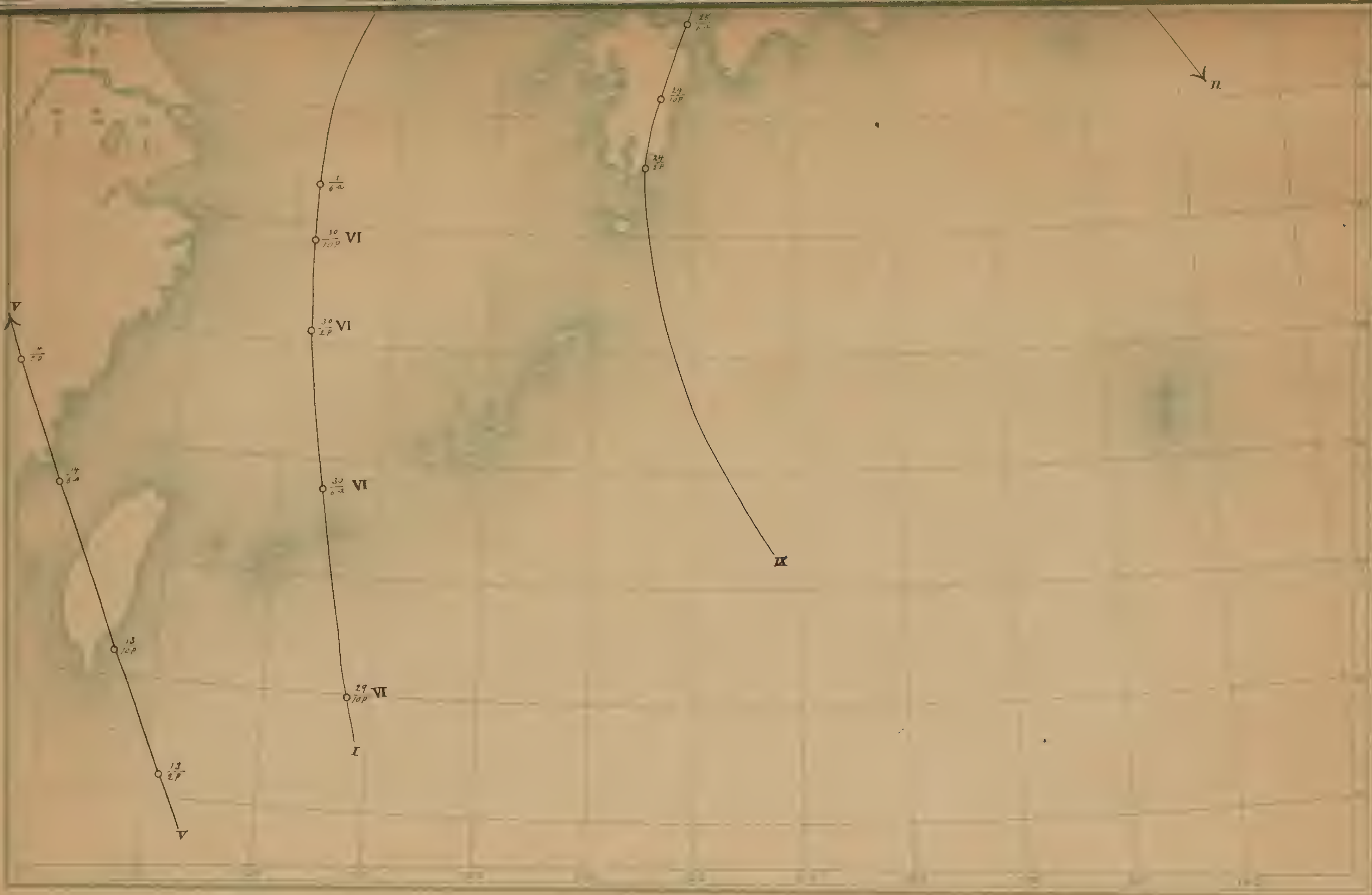



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TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
June, 1898.
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TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
July, 1898.
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PL.VIII.



TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
August, 1898.
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TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
September, 1898.
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VII



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20/10p
21/6a
21/2p
20/2p
1/2p X
30/10p
30/2p
30/6a
29/10p

PL. X.

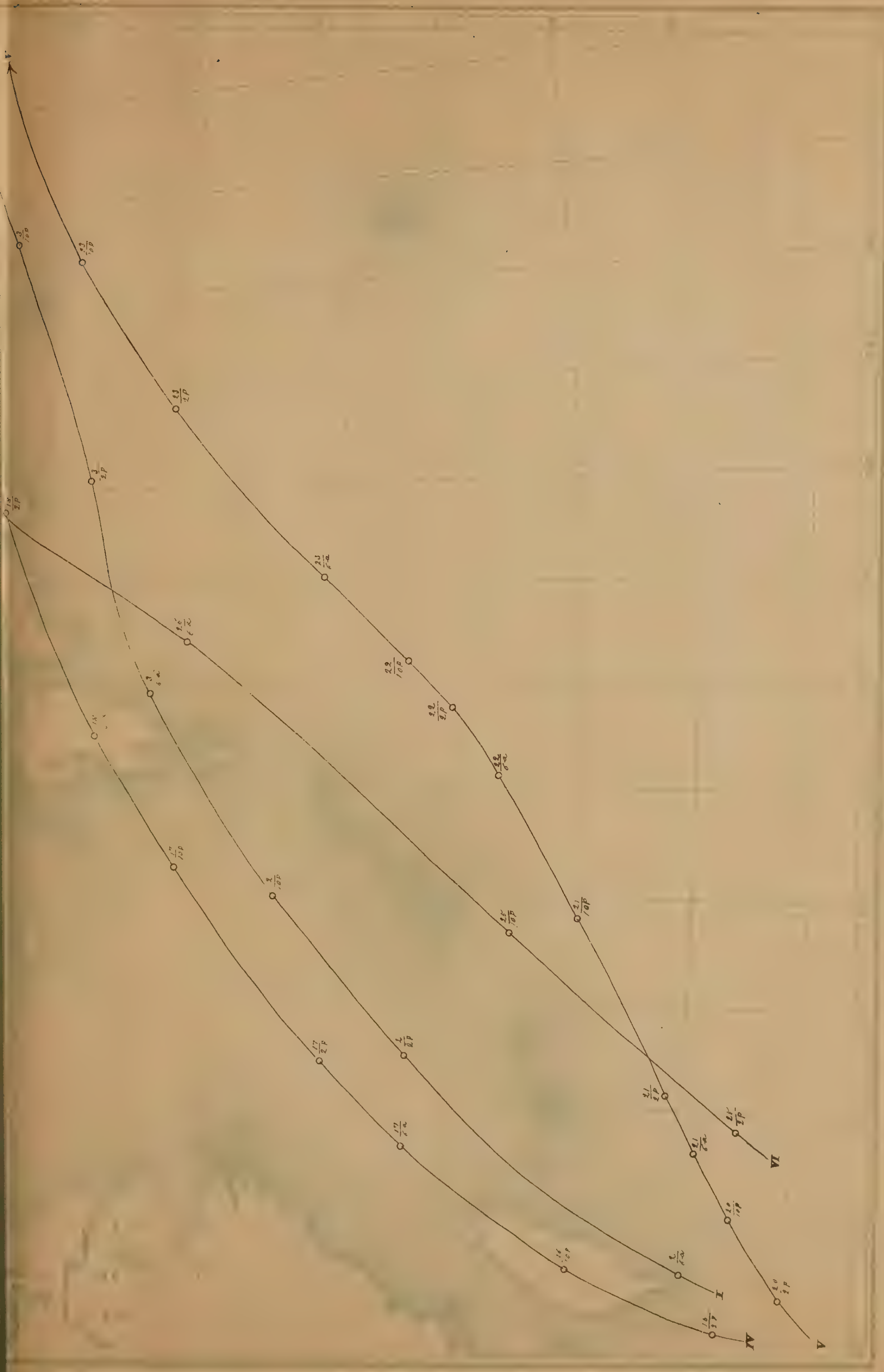




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PL.XI.


TRACKS
OF THE
BAROMETRIC DEPRESSIONS.
November, 1898.
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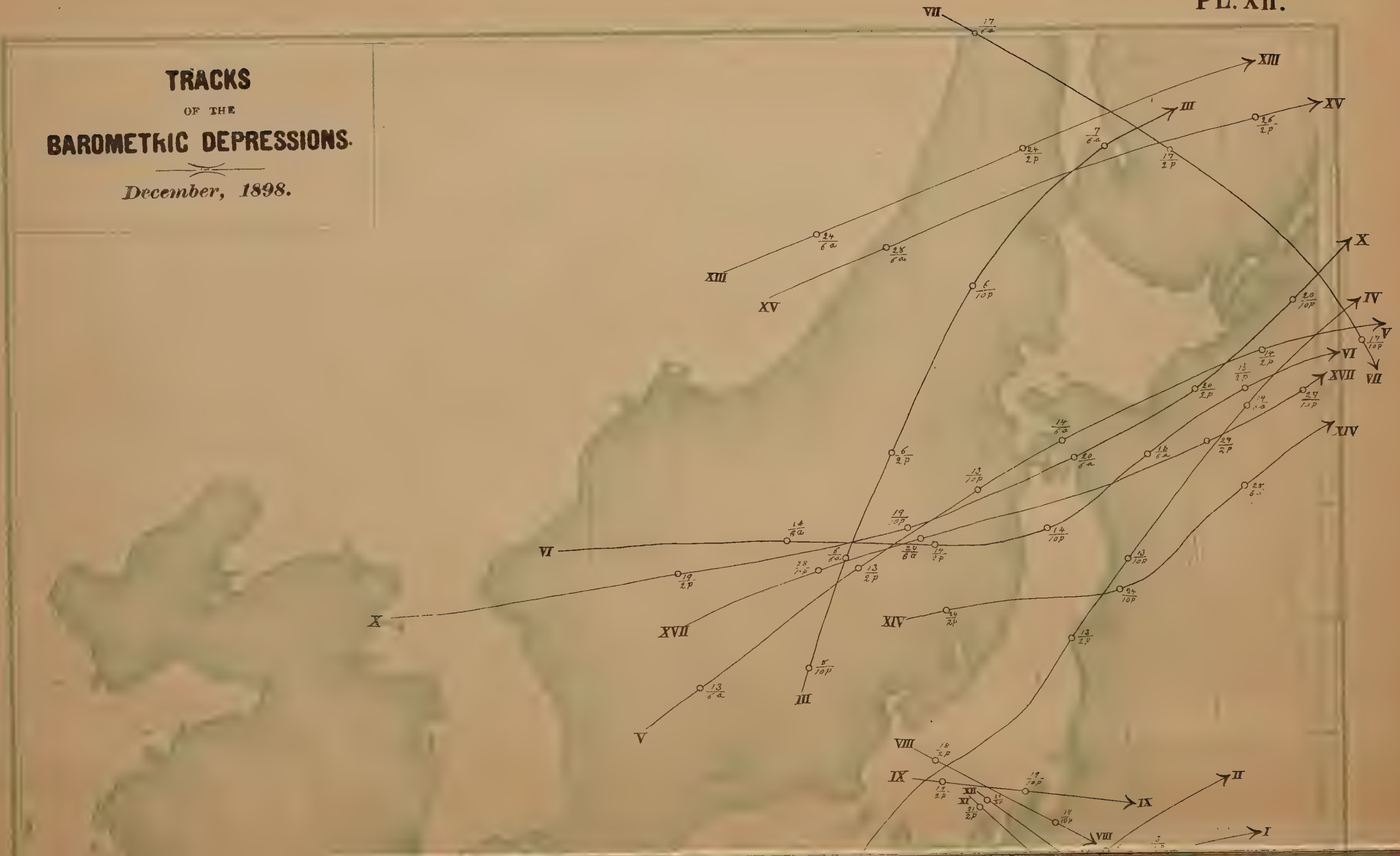


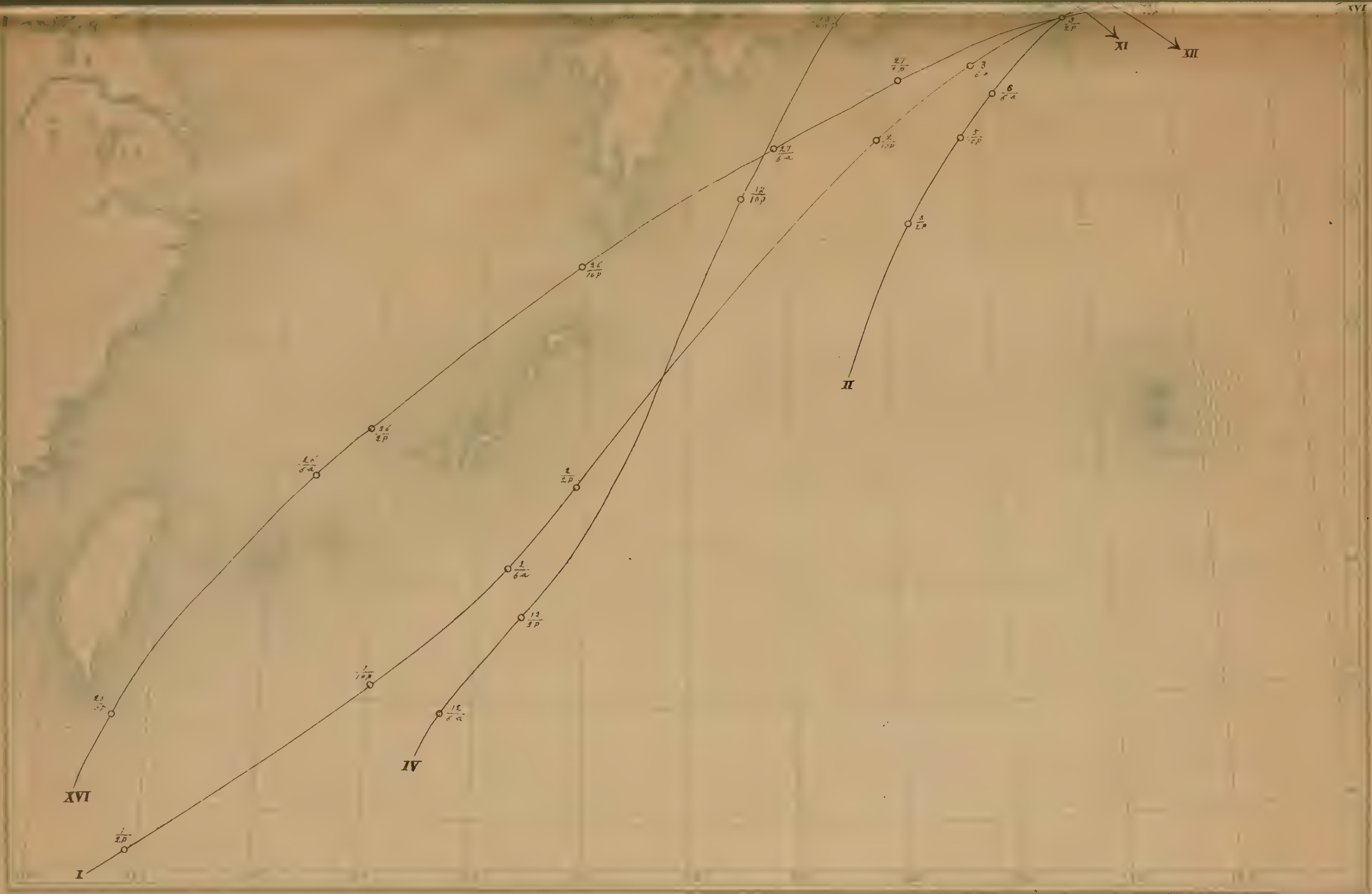
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PL. XII.

TRACKS
OF THE
BAROMETRIC DEPRESSIONS.

December, 1898.





XI
XII
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XVI
I

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